1-4007; Daniel McCarthy et al.
APPARATUS AND METHOD FOR MONITORING
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FIG. 1

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START

1002 DEVELOP CODING SHEET

1000 DETERMINE RECORDING METHOD

1003 MODEL CALL FLOW AS FINITE STATE AUTOMATON

1004 RECORD CALLS

SPLIT CALL RECORDINGS

1005 ANNOTATE CALLS (AGENT-CALLER DIALOGS)

1006 OBTAIN PROMPT SAMPLES

1007 RUN DTMF DETECTION

1008 CONFIGURE PROMPT DETECTION

1009 RUN CALL SPLITTING

DTMF SEQUENCE

1010 RUN PROMPT DETECTION

1011 CONFIGURE PROMPT INFERENCE

PROMPT OCCURENCES

1012 RUN PROMPT INFERENCE

IVR EVENT SEQUENCES

1013 RUN COMPILATION OF IVR EVENT SEQUENCES

AGENT-CALLER DIALOG EVENT SEQUENCES

1014 CONFIGURE CALL SEGMENT TIMING ANALYSIS

1015 CONFIGURE ROUTING ANALYSIS

1016 CONFIGURE AUTOMATION ANALYSIS SPREADSHEETS

1017 CONFIGURE STATE CLUSTERING

1018 COMPILE LIFE-OF-CALL DIAGRAM

1019 RUN ROUTING ANALYSIS SCRIPTS

1020 CREATE AUTOMATION ANALYSIS REPORT

1021 COMPILE RAW USER-PATH DIAGRAM

1022 CLEANUP LIFE-OF-CALL DIAGRAM

1023 CLEANUP ROUTING ANALYSIS

1024 IDENTIFY PROBLEMS & INFER RECOMMENDATIONS

CLEANUP USER-PATH DIAGRAM

1025

FIG. 1A

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FIG. 2A

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FIG. 2B

1-4007; Daniel McCarthy et al.
APPARATUS AND METHOD FOR MONITORING
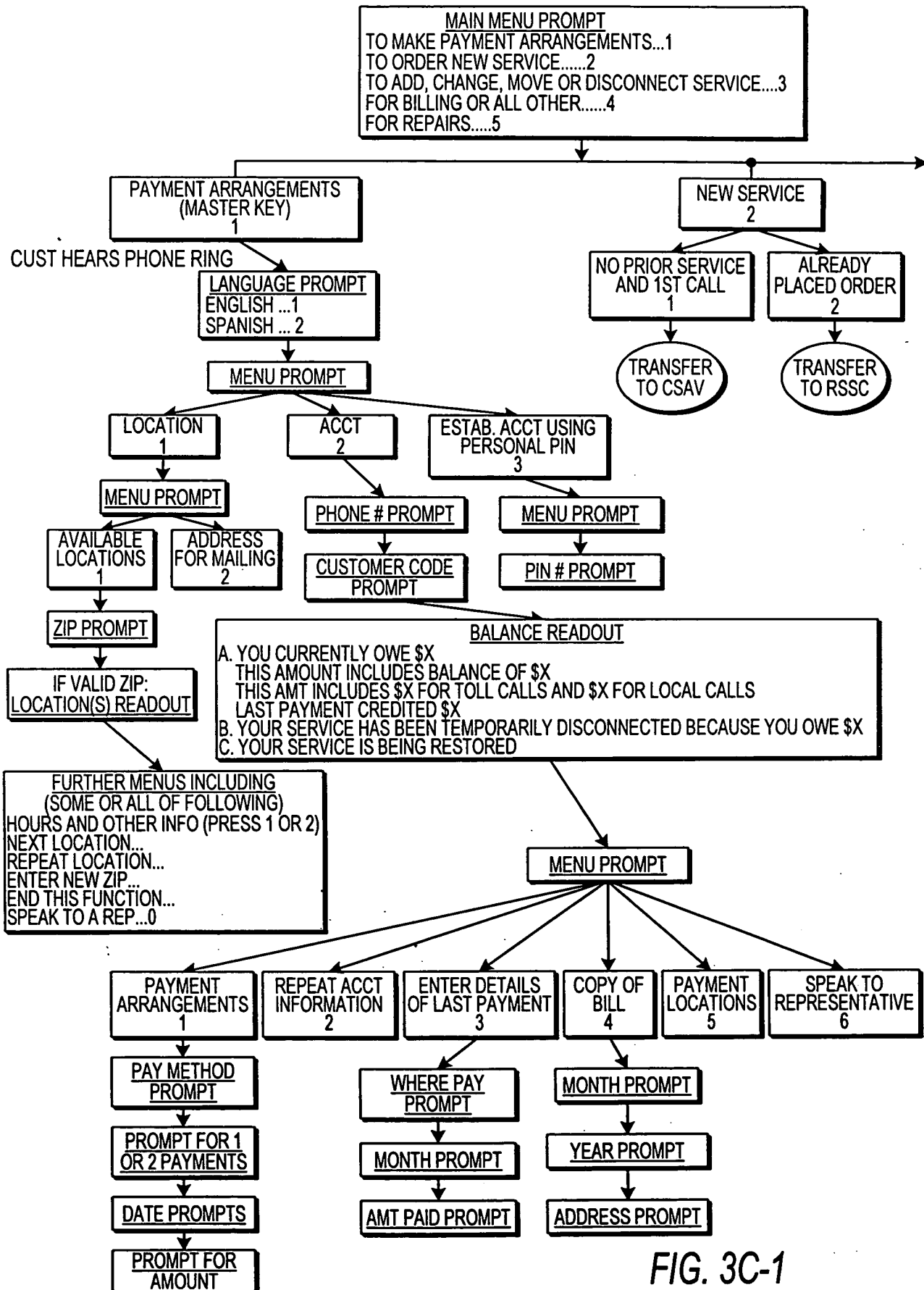PERFORMANCE OF AN AUTOMATED RESPONSE
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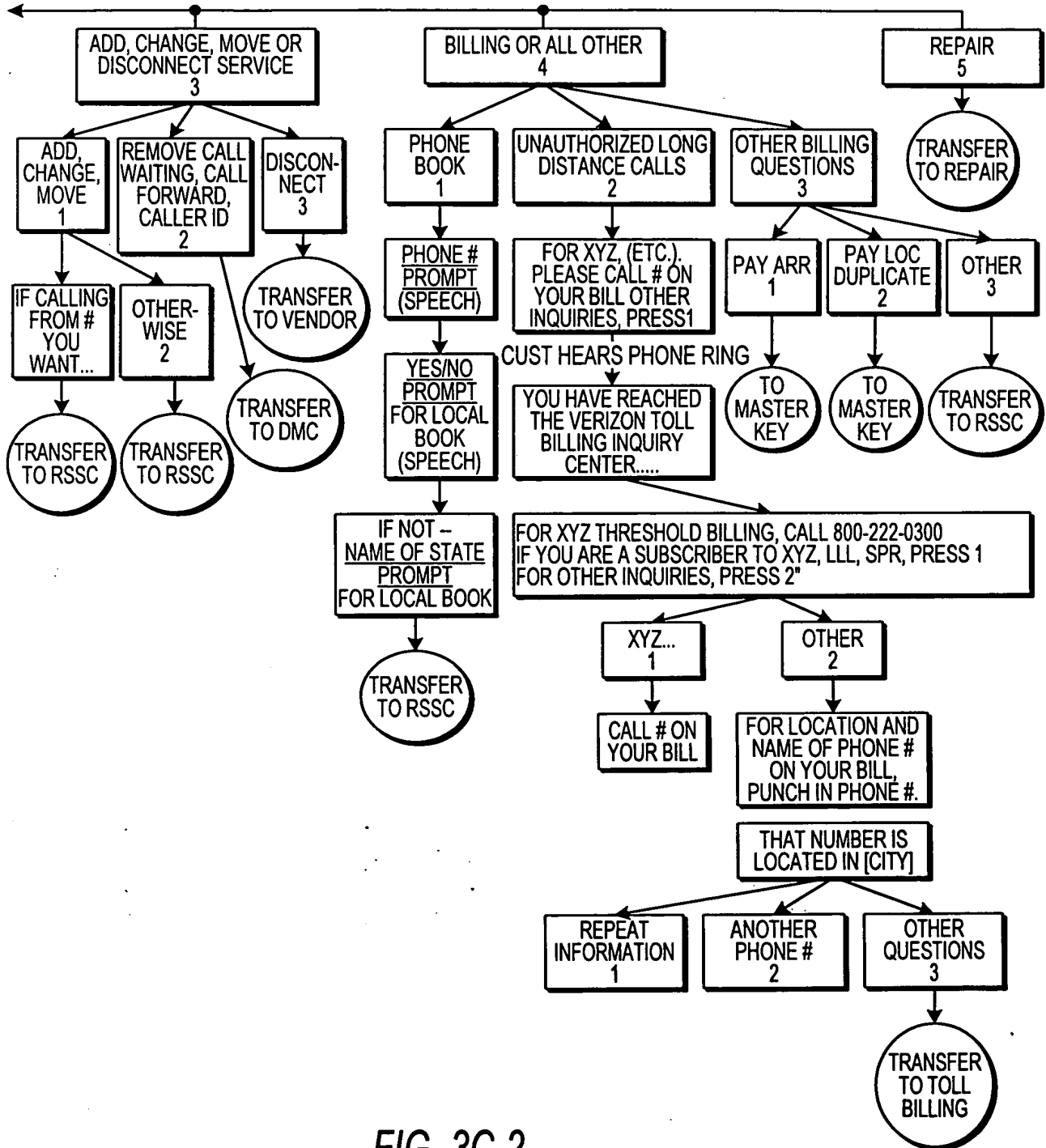
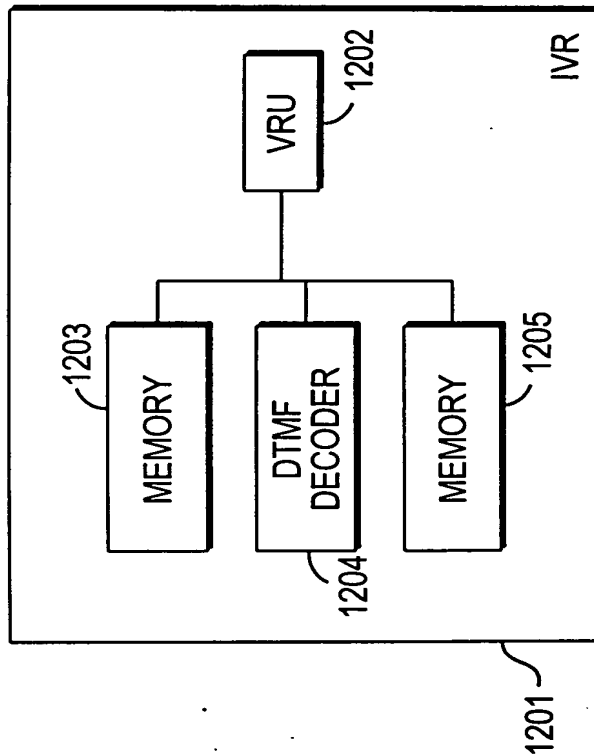FIG. 2C

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FIG. 3A

START

EMERGENCY GREETING #1

GREETING #2 → SPAN=2

ENG=1

MAIN MENU
1=DL
2=VR
3=LOC/APPT
4=SMOG IMPACT
5=WOOSLEY
61-66=HOT TOPICS

DL
1=RENEW
2=STATUS
3=REPLACE
4=O/S
5=NEW
6=OTHER

TO RENEW YOUR LICENSE OR ID...
1=STATUS
2=APPT
3=FORMS

1=FAQ'S
2=APPT

IF YOUR LICENSE RENEWAL HAS BEEN RECEIVED...
1=NOTICE RECD
2=NOT RECD
3=NAME CHG
4=ADDRESS CHG
5=ID CARD

IF YOUR LICENSE IS NOT EXPIRED...
1=LIC NOT EXP
2=LIC EXP

XFER TO TECH

2=APPT MSG
2=APPT MSG

1=FAQ'S
2=APPT
3=FORMS

1=FAQ'S
2=APPT
3=FORMS

IF YOU APPLIED FOR YOUR DL OR ID...
1=NOT RECD
2=DUI
3=ACCIDENT
4=CHILD SUPP
5=OTHER

MSG

IF REPLACE YOUR LICENSE AND YOU ARE CALLING FROM...
1=WITHIN CA
2=OUTSIDE CA
3=REPLACE ID

MSG

IF YOU ARE FROM ANOTHER STATE
1=O/S > 18
2=O/S < 18
3=COUNTRY > 18
4=COUNTRY < 18
5=NO LIC
6=REG VEH

1=FAQ'S
2=APPT
3=FORMS

IF YOU ARE UNDER 18...
1=<18 AUTO
2=>18 AUTO
3=<21 M/C
4=>21 M/C
5=CDL
6=ID CARD

1=FAQ'S
2=APPT
3=FORMS

VR
1=RENEW
2=STATUS
3=REPLACE
4=BUY/SELL
5=MOVE TO CA
6=OTHER VEH

IT TAKES 6 WKS MSG

TO RENEW YOUR REGISTRATION...

TO RENEW YOUR REGISTRATION AND YOU HAVE RECEIVED...
1=NOTICE RECD
2=NOT RECD
3=NAME CHG
4=ADDRESS CHG

IF YOUR REGISTRATION HAS NOT EXPIRED...
1=REG NOT EXP
2=REG EXP

XFER TO TECH

1=FAQ'S
2=APPT
3=FORMS

TO REPLACE LOST OR STOLEN STICKERS...
1=REPLACE STICK
2=REPL/DUP REG
3=REPL/DUP TITLE
4=PERS PLATES
5=REPL LOST..PLTS
6=DISABLED PLTS

1=FAQ'S
2=APPT
3=FORMS

TO BUY A VEHICLE OR WATERCRAFT...
1=BUY VEH
2=SELL VEH
3=XFER VEH

FOR VEHICLE OR WATERCRAFT QUESTIONS...
1=VEH/WATERCRAFT
2=DL/ID (GO TO DL O/S)

TO HEAR FAQS REGARDING MOVING TO CA...

1=FAQ'S
2=APPT
3=FORMS

FOR SMOG RELATED QUESTIONS...
1=SMOG
2=DISABLED
3=OTHER

FOR A TEMPORARY DISABILITY...
1=TEMP
2=PERM

1=FAQ'S
2=APPT
3=FORMS

IF YOU ARE CALLING TO SCHEDULE A BEHIND-THE-WHEEL...
1=HOURS/LOC
2=ROAD TEST
3=DL OR ID APPT
4=VR OR WATERCRAFT APPT

XFER TO TECH

TO FIND THE DMV OFFICE NEAREST YOU...

ZIP CODE LOCATOR

THE FIRST AVAILABLE APPT...

APPT MSG
1=FIRST AVAILABLE
2=NEW DATE/TIME
3=ANOTHER OFFICE

APPT NOT AVAILABLE

TELEPHONE # BOOK APPT

SEARCH APPT SYSTEM

APPT AVAILABLE

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FIG. 3C-1	FIG. 3C-2

FIG. 3B

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MAIN MENU PROMPT
TO MAKE PAYMENT ARRANGEMENTS...1
TO ORDER NEW SERVICE......2
TO ADD, CHANGE, MOVE OR DISCONNECT SERVICE....3
FOR BILLING OR ALL OTHER......4
FOR REPAIRS.....5

PAYMENT ARRANGEMENTS
(MASTER KEY)
1

NEW SERVICE
2

NO PRIOR SERVICE
AND 1ST CALL
1

ALREADY
PLACED ORDER
2

TRANSFER
TO CSAV

TRANSFER
TO RSSC

CUST HEARS PHONE RING

LANGUAGE PROMPT
ENGLISH ...1
SPANISH ... 2

MENU PROMPT

LOCATION
1

ACCT
2

ESTAB. ACCT USING
PERSONAL PIN
3

MENU PROMPT

PHONE # PROMPT

MENU PROMPT

AVAILABLE
LOCATIONS
1

ADDRESS
FOR MAILING
2

CUSTOMER CODE
PROMPT

PIN # PROMPT

ZIP PROMPT

BALANCE READOUT
A. YOU CURRENTLY OWE $X
   THIS AMOUNT INCLUDES BALANCE OF $X
   THIS AMT INCLUDES $X FOR TOLL CALLS AND $X FOR LOCAL CALLS
   LAST PAYMENT CREDITED $X
B. YOUR SERVICE HAS BEEN TEMPORARILY DISCONNECTED BECAUSE YOU OWE $X
C. YOUR SERVICE IS BEING RESTORED

IF VALID ZIP:
LOCATION(S) READOUT

FURTHER MENUS INCLUDING
(SOME OR ALL OF FOLLOWING)
HOURS AND OTHER INFO (PRESS 1 OR 2)
NEXT LOCATION...
REPEAT LOCATION...
ENTER NEW ZIP...
END THIS FUNCTION...
SPEAK TO A REP...0

MENU PROMPT

PAYMENT
ARRANGEMENTS
1

REPEAT ACCT
INFORMATION
2

ENTER DETAILS
OF LAST PAYMENT
3

COPY OF
BILL
4

PAYMENT
LOCATIONS
5

SPEAK TO
REPRESENTATIVE
6

PAY METHOD
PROMPT

WHERE PAY
PROMPT

MONTH PROMPT

PROMPT FOR 1
OR 2 PAYMENTS

MONTH PROMPT

YEAR PROMPT

DATE PROMPTS

AMT PAID PROMPT

ADDRESS PROMPT

PROMPT FOR
AMOUNT

FIG. 3C-1

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ADD, CHANGE, MOVE OR
DISCONNECT SERVICE
3

BILLING OR ALL OTHER
4

REPAIR
5

ADD,
CHANGE,
MOVE
1

REMOVE CALL
WAITING, CALL
FORWARD,
CALLER ID
2

DISCON-
NECT
3

PHONE
BOOK
1

UNAUTHORIZED LONG
DISTANCE CALLS
2

OTHER BILLING
QUESTIONS
3

TRANSFER
TO REPAIR

IF CALLING
FROM #
YOU
WANT...

OTHER-
WISE
2

TRANSFER
TO VENDOR

PHONE #
PROMPT
(SPEECH)

FOR XYZ, (ETC.)
PLEASE CALL # ON
YOUR BILL OTHER
INQUIRIES, PRESS1

PAY ARR
1

PAY LOC
DUPLICATE
2

OTHER
3

TRANSFER
TO RSSC

TRANSFER
TO RSSC

TRANSFER
TO DMC

YES/NO
PROMPT
FOR LOCAL
BOOK
(SPEECH)

CUST HEARS PHONE RING

YOU HAVE REACHED
THE VERIZON TOLL
BILLING INQUIRY
CENTER.....

TO
MASTER
KEY

TO
MASTER
KEY

TRANSFER
TO RSSC

IF NOT –
NAME OF STATE
PROMPT
FOR LOCAL BOOK

FOR XYZ THRESHOLD BILLING, CALL 800-222-0300
IF YOU ARE A SUBSCRIBER TO XYZ, LLL, SPR, PRESS 1
FOR OTHER INQUIRIES, PRESS 2"

TRANSFER
TO RSSC

XYZ...
1

OTHER
2

CALL # ON
YOUR BILL

FOR LOCATION AND
NAME OF PHONE #
ON YOUR BILL,
PUNCH IN PHONE #.

THAT NUMBER IS
LOCATED IN [CITY]

REPEAT
INFORMATION
1

ANOTHER
PHONE #
2

OTHER
QUESTIONS
3

TRANSFER
TO TOLL
BILLING

FIG. 3C-2

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FIG. 3D

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STATE	TIME	OUTCOME
CALL ARRIVAL	##:##.##	DATE; CALLER IDENTIFICATION
INITIAL MENU	##:##.##	TOUCH TONE SELECTION, E.G., 3
TELEPHONE NUMBER PROMPT	##:##.##	TOUCH TONE NUMBERS PRESSED, E.G., 617-555-1212
VALIDATE TELEPHONE NUMBER	##:##.##	INVALID NUMBER
TELEPHONE NUMBER RE-PROMPT	##:##.##	TOUCH TONE NUMBERS PRESSED
VALIDATE TELEPHONE NUMBER	##:##.##	VALID NUMBER
MENU 1	##:##.##	TOUCH TONE SELECTION
QUERY A	##:##.##	TOUCH TONE NUMBERS PRESSED
QUERY B	##:##.##	TOUCH TONE NUMBERS PRESSED
MENU 2	##:##.##	TOUCH TONE SELECTION
TRANSFER TO AGENT	##:##.##	TRANSFER QUEUE (CALLER ON HOLD)
IVR END	##:##.##	TRANSFER COMPLETED

FIG. 3E

1-4007; Daniel McCarthy et al.
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UNIQUE ID	TIME	STATE	OUTCOME
212-123-4567	##,##,##	CALL ARRIVAL	DATE
212-123-4567	##,##,##	INITIAL MENU	TOUCH TONE SELECTION
212-123-4567	##,##,##	ACCOUNT NO. PROMPT	TOUCH TONE NUMBERS PRESSED
212-123-4567	##,##,##	VALIDATE NUMBER	INVALID
212-123-4567	##,##,##	ACCOUNT NO. RE-PROMPT	CALL TERMINATED BY CALLER
201-321-4567	##,##,##	CALL ARRIVAL	DATE
201-321-4567	##,##,##	INITIAL MENU	TOUCH TONE SELECTION
201-321-4567	##,##,##	ACCOUNT NO. PROMPT	TOUCH TONE NUMBERS PRESSED
201-321-4567	##,##,##	VALIDATE NUMBER	VALID
201-321-4567	##,##,##	MENU 1	TOUCH TONE SELECTION
201-321-4567	##,##,##	TRANSFER TO AGENT	TRANSFER COMPLETED
617-987-6543	##,##,##	CALL ARRIVAL	DATE
617-987-6543	...	...	...
617-987-6543	##,##,##	ACCOUNT BALANCE	INFORMATION DELIVERED
617-987-6543	##,##,##	MENU 3	TOUCH TONE ELECTION
617-987-6543	##,##,##	TRANSFER TO AGENT	TRANSFER QUEUE (CALLER ON HOLD)
617-987-6543	##,##,##	IVR END	CALL TERMINATED BY CALLER

FIG. 3F

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RECORDING — 101

RAW RECORDINGS

WAVEFORM CONVERSION — 102

CALL SPLITTING — 103

PROMPT DETECTION — 104

WAVEFORM (ONE PER CALL)

PROMPT SAMPLES — 109

PROMPT DETECTION — 105

SPEECH/ NON-SPEECH DETECTION — 106

DTMF DETECTION — 107

CALL CLASSIFICATION — 108

PROMPT OCCURENCES

SPOKEN USER INPUT

DTMF SEQUENCE

CALL SUBSETS

PROMPT INFERENCE — 110

CALL-FLOW SPEC — 111

(INFERRED) SEQUENCE OF IVR EVENTS

ANNOTATION (TRANSCRIBERS) — 112

STATISTICS GENERATION — 113

CALL-FLOW SPEC — 111

USER-PATH DIAGRAM

IVR SYSTEM AUTOMATION ANALYSIS

FULL TRANSCRIPT

FIG. 4

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FIG. 5

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FIG. 6A

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FIG. 6B

FIG. 6B-1
FIG. 6B-2
FIG. 6B-3
FIG. 6B-4

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APPARATUS AND METHOD FOR MONITORING
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	10	38	53	64	M-10	M-33	M-71	M-130	M-178	M-215
CALL NUMBER	10	38	53	64	M-10	M-33	M-71	M-130	M-178	M-215
TRANSCRIBER	YJT	YJT	YJT	64	MJW	MJW	MJW	MJW	MJW	MJW
DATE:	12/14/1996	12/17/1996	12/19/1996	27-DEC						
PHONE #:		2121234567	2011234567	9141234567	9731234567	9181234567	7321234567	5161234567	2021234567	7181234567
SEX OF CALLER:		M	M	F	M	M	F	F	M	M
CLOCK TIME (END OF INTERACTION)	1:58 PM	12:03 PM	2:40 PM	2:21 PM	12:41 PM	14:50:41	14:30:57	9:46:48	12:10:21	12:01:11
DURATION OF INTERACTION (WHOLE MIN)	0	6	12	10	4	0	1	4	9	3
DURATION OF ENTIRE CALL (WHOLE MIN)	0	6	12	11	5	3	3	12	68	5
WAS THIS A FULLY AUTOMATED CALL?	0	0	0	0	0	0	0	0	0	0
DID CALL INVOLVE AN AGENT?	1	1	1	1	1	0	1	1	1	1
DEBUG	0	0	0	0	0	0	0	0	0	0
IVR SUMMARY: (MENU CHOICES)	4	3	3	4	BILLING, OTHER	ADD/CHANGE	REPAIR	NEW	NEW	BILLING, OTHER
(USE WORDS: "PHONE #" "RING" "FAST BUSY" "HANG UP" "ROTARY"	3	1	1	0 INVALID	OTHER	ADD/CHANGE		INPUT NUMBER 2.2	2.2	OTHER
"HANG UP" "ROTARY"	HANG UP RING	PHONE NO RING		3	4,3,3	3,1 973-622-3626	973-622-3626	2.2		4,3,3
DID CALLER TRY 0 AND FAIL?	0	0	0	1	0	0	0	1	0	0
WAS CALL INCOMPLETE (0 FUNCTIONS?)	0	0	0	0	0	1	0	0	0	0
(IF 1 INDICATE WHICH ONE APPLIES)										
ABANDON AT START OF IVR (RINGING OR INTRO)										
ABANDON AT PHONE # PROMPT										
ABANDON AT CUSTOMER ID PROMPT										
ABANDON AT OTHER PROMPT	1									
ABANDON WHILE RINGING FOR AGENT						1				
ABANDON AT "ALL OUR AGENTS ARE CURRENTLY"										
ABANDON AT "FAST BUSY OR SYSTEM BUG										
UNUSUALLY HEAVY CALL VOLUMES										
WHERE IN IVR DID THEY ABANDON										
1 MASTERKEY										
2 NEW SERVICE						1				
3 ADD/CHANGE										
4 BILLING/OTHER	1									
5 REPAIR										
(IF CALLER GOT TO AN AGENT, HOW?)										
BY ROTARY PHONE (0 TONES PRESSED?)										
BY AUTO TRANSFER BASED ON PHONE NUMBER?							1	1		
THROUGH INTRODUCTION BY PREVIOUS AGENT?		1								
IN IVR THROUGH INVALID/TIMEOUT?										
IN IVR, THROUGH A VALID NONZERO TRANSFER?	0		1	1	1	0	0	0	1	1
BY PRESSING "0"										
OTHER (DIDN'T CATCH IT)										
INDICATE MENU CHOICES MADE IN IVR										
1 PAY ARRANGEMENTS (MASTER KEY)										
2:1 ORDER NEW SERVICE (WELCOME CENTER)									1	1

FIG. 6B-1

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	WANTS TO ADD LONG DISTANCE TO MOTHER'S PHONE AND DROP FREE 30-DAY-TRIAL FEATURES	ANGRY LAND-LORD CALLING FOR TENANTS. WARM TRANSFER IN AT START TENANT IN APT 3 MOVING TO APT 4. WAS UNABLE TO GET THROUGH ON A MONDAY AFTER 45 MINUTES.	CUSTOMER UNHAPPY WITH XYZ. WANTS TO SWITCH TO VERIZON REGIONAL. 3-AREA SELECTIVE CALLING.	RECEIVED VZ TELEMARKETING CALL. NOT A VZ CUST. AND JUST WANTS TO BE REMOVED FROM TELEMARKETING LIST. BLOCK ADDED TO LINE FOR VZ TELEMRK	CALLER THOUGHT IT WAS A VOICE-RECO SYSTEM AND WHEN PROMPTED FOR PHONE NUMBER, SPOKE IT AND DIDN'T PUT IT IN. NEEDS REPAIR DONE ON THE JACK IN HER ROOM. SCHEDULED AN APPT FOR BET 12-7 TOMORROW.	LEASING A PHONE COSTS MONEY WORRIED THAT SHE THREW A PHONE OUT AND SOMEONE IS USING IT. SHE'S STILL GETTING A BILL FOR IT PHONE LEASED THROUGH XYZ AND SO IS TRANSFERRED TO XYZ LEASING. W/O HAVING REALISED THAT PHONE IS NOT CONNECTED TO NUMBER AND SHE'S NOT GETTING BILLED FOR OTHER CALLS. / NEW SVC ORDER ASSIGNED A NEW # AND T-> WELCOME CTR.	SON CHECKING ON CALLS THAT HE DOESN'T RECOGNIZE SISTER DIALING ID NUMBER FOR INTERNET ACCESS AND SHELL HAVE TO PAY FOR THE CALLS.
2-2 NEW SERVICE - FOLLOW-UP							
3-1 ADD/ADD	1						
3-2 ADD/REMOVE		1					
3-3 DISCONNECT							
4-1 BILLING/PHONE DIRECTORY							
4-2 BILLING/UNAUTHORIZED CALLS							
4-3-1 BILLING/OTHER/PAY/MASTER K							
4-3-2 BILLING/OTHER/MASTER KEY							
4-3-3 BILLING/OTHER/OTHER				1			
5 REPAIR (REPAIR CENTER)					1		
1-2 (SPANISH)							
(INDICATE FUNCTIONS COMPLETED IN IVR)	1		1				1
PAYMENT CENTER LOCATION							
PAYMENT CENTER HOURS							
PAYMENT MAILING ADDRESS							
ACCOUNT INFORMATION							
ESTABLISH ACCE USING PIN							
PAYMENT ARRANGEMENTS							
ENTER DETAILS OF LAST PAYMENT							
COPY OF BILL							
AGENT CALL SUMMARY: (PROBLEM + SOLUTION)							
COULD THIS HAVE BEEN DONE IN MK/TB	0	0	0	0	0	0	1
I. AGENT PERFORM AUTOMATED FUNCTIONS?							
(INDICATE WHICH ONES)							
PAYMENT CENTER LOCATION							
PAYMENT CENTER HOURS							
PAYMENT MAILING ADDRESS							
ACCOUNT INFORMATION							
ESTABLISH ACCT USING PIN							
PAYMENT ARRANGEMENTS							
ENTER DETAILS OF LAST PAYMENT							
COPY OF BILL							
II. AGENT DO POTENTIALLY AUTOFUNCTIONS?	0	0	0	0	0	0	0

FIG. 6B-2

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INDICATE WHICH ONES								
REQUEST CALLING CARD								
GET VOICE MAIL ACCESS #								
GET 3 + 2 DIGIT NUMBER ON BILL								
GET INFO ON RATES-BY MAIL OR SEE DIRECT	0	0	1	1	1	1	0	0
GET ADDRESS FOR WRITING TO REFUTE BILL								
OTHER: (POTENTIALLY AUTOMATABLE)								
III. DID AGENT DO NON-AUTOMATED FUNCTIONS?		1	1	1	1			
INDICATE WHICH ONES								
PAYMENT ARRANGEMENTS								
NEW SERVICE-EXPLAINS 2 PARTS NEEDED								
NEW SERVICE FOLLOW UP (NOT DISCONNECT)	0	1	1	1				
CHECK ON STATUS OF PENDING ORDER				1				
SALES (PKGS, SERVICES, LINES, JACKS, ETC)								
SALES (REMOVE FEATURE- AGENT AKS WHY)								
DISCONNECT (AND FORWARD CALLS)								
EXPLAIN BILL								
REMOVE UNAUTHORIZED CALL FROM BILL								
REMOVE OTHER CHARGES FROM BILL								
CONFIRM TODAY'S REPAIR SCHEDULE								
SCHEDULE A VISIT WITH REPAIRMAN					1			
TELL HOW/WHEN TO USE FEATURES THEY OWN								
OTHER	2	0	2	2	3	1	1	2
WAS THIS CALL CODED ABOVE?	0	0	0	0	0	1	1	0
DID AGENT SEE CALL AS MISDIRECTED?			1			1	1	
DID AGENT TRANSFER THE CALL?								
IV. IF TRANSFERRED TO WHAT DESTINATION?	S	S						
800-281-8584 MASTER KEY								
800-275-2355 REPAIR								
800-287-9933 COLLECTION CENTER								
800-870-01000 SERVICE SOLUTIONS								
TPV								
888-243-9733 TOLL BILLING								
800-246-2800 UNLAWFUL CALL SOL CTR								
800-585-6127 INSTALLATION HOTLINE								
877-525-2375 DSL								
800-422-9977 "BUSINESS OFFICE"								
DMC								
NEW SERVICE FOLLOWUP								
DISCONNECT								
TELL HOW TO USE FEATURES							1	
WELCOME CENTER								
BUSINESS ACCOUNTS								

FIG. 6B-3

1-4007; Daniel McCarthy et al.
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SYSTEM
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DIFFERENT CARRIER							1	1
SUPERVISOR								
TRANSFER TO SPANISH AGENT								
WAS TRANSFER WARM (AGENT STAYED)?			1	1	1		7	1
DURATION WITH SECOND AGENT?			1	1	1		7	58
FURTHER TRANSFERS?							0	0
IF YES)								
TOTAL NUMBER OF AGENTS INVOLVED			2	2	2		2	2
EXPLAIN:							XYZ EXPLAINED THAT LEASING IS ENDED AND THE PHONE ISN'T CONNECTED TO HER BILLING NUMBER. 2ND AGENT ASSIGNS RATE PLAN, ETC.	
TOPIC SUMMARY								
PAYMENT ARRANGEMENT	0	0	0	0	0	0	0	0
NEW SERVICE	0	1	1	0	0	0	0	0
ORDER FOLLOW-UP	0	0	0	1	1	0	0	0
SALES - ADD	0	0	0	0	0	0	0	0
SALES-REMOVE	0	0	0	0	0	0	0	0
DISCONNECT	0	0	0	0	0	0	0	0
BALANCE/COPY...	0	0	0	0	0	0	0	0
OTHER	0	1	1	0	1	0	1	1
REPAIR	0	0	0	0	0	0	0	0
SPANISH	0	0	0	0	0	0	0	0
REROUTE	0	1	1	1	1	1	1	1
ROUTING SUMMARY								
1 OR 4-3-1 PAY ARRANGEMENTS (MASTER KEY)	0	0	0	0	0	0	0	0
2-1 ORDER NEW SERVICE (WELCOME CENTER)	0	1	1	0	0	0	0	1
2-2 NEW SERVICE - FOLLOW-UP	0	0	0	1	1	0	0	0
3-1 ADD/ADD	0	0	0	0	0	0	0	0
3-2 ADD/REMOVE	0	0	0	0	0	0	0	0
3-3 DISCONNECT	0	0	0	0	0	0	0	0
4-1 BILLING/PHONE DIRECTORY	0	1	1	0	0	0	0	0
4-2 BILLING/UNAUTHORIZED CALLS	0	0	0	0	0	0	0	0
4-3-2 BALANCE/COPY/LOCATIONS/LAST PAYMENT	0	0	0	0	0	0	0	0
4-3-3-OTHER	0	1	1	0	0	0	0	1
5 REPAIR (REPAIR CENTER)	0	0	0	0	0	0	0	0
1-2 (SPANISH)	0	0	0	0	0	0	0	0
ROTARY (INITIAL TIMEOUT)	0	1	1	1	1	1	1	1
INVALID, TIMEOUT, OR "0" ONCE IN IVR	0	1	1	1	1	1	1	1
OTHER (UNKNOWN)								

FIG. 6B-4

1-4007; Daniel McCarthy et al.
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FIG. 6C

FIG. 6C-1
FIG. 6C-2
FIG. 6C-3
FIG. 6C-4

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	A	C	D	E
1	CALL NUMBER	ALL CALLS STATISTICS		
2	TRANSCRIBER			
3	DATE:			
4	PHONE #:			
5	SEX OF CALLER:			
6	CLOCK TIME (END OF INTERACTION)			
7	DURATION OF INTERACTION (WHOLE MIN)	5.123042506	0%	
8	DURATION OF ENTIRE CALL (WHOLE MIN)	7.548098434	0%	
9	WAS THIS A **FULLY AUTOMATED CALL?**	14	3%	
10	DID CALL INVOLVE AN AGENT?	339	447	
11				
12	IVR SUMMARY: (MENU CHOICES)	0	0%	
13	(USE WORDS: "PHONE #" "RING" "FAST BUSY"	0	0%	
14	"HANG UP" "ROTARY"	0	0%	
15				
16	DID CALLER TRY 0 AND FAIL?	30	7%	
17	**WAS CALL INCOMPLETE (O FUNCTIONS?)**	94	21%	
18	[IF 1, INDICATE WHICH ONE APPLIES]	0	0%	
19	ABANDON AT START OF IVR (RINGING OR INTRO)	0	0%	
20	ABANDON AT PHONE # PROMPT	4	1%	
21	ABANDON AT CUSTOMER ID PROMPT	2	0%	
22	ABANDON AT PROMPT	22	5%	
23	ABANDON WHILE RINGING FOR AGENT	2	0%	
24	ABANDON AT "ALL OUR AGENTS ARE CURRENTLY"	4	1%	
25	ABANDON AT FAST BUSY OR SYSTEM BUG	14	3%	
26	UNUSUALLY HEAVY CALL VOLUMES	17	4%	
27	OTHER:	29	6%	
28	**WHERE IN IVR DID THEY ABANDON**			
29	1 MASTERKEY	20	4%	
30	2 NEW SERVICE	3	1%	
31	3 ADD/CHANGE	13	3%	
32	4 BILLING/OTHER	12	3%	
33	5 REPAIR	2	0%	
34	OTHER	18	4%	
35				
36	[IF CALLER GOT TO AN AGENT, HOW?]	0	0%	
37	BY ROTARY PHONE (0 TONES PRESSED)?	62	14%	
38	BY AUTO TRANSFER BASED ON PHONE NUMBER?	0	0%	
39	THROUGH INTRODUCTION BY PREVIOUS AGENT?	0	0%	
40	IN IVR THROUGH IVALID/TIMEOUT?	28	6%	
41	**IN IVR, THROUGH A VALID NONZERO TRANSFER?**	228	51%	
42	BY PRESSING "0"	19	4%	
43	OTHER (DIDN'T CATCH IT)	2	0%	
44	INDICATE MENU CHOICES MADE IN IVR	0	0%	
45	**1. PAY ARRANGMENTS (MASTER KEY)**	12	3%	
46	2-1 ORDER NEW SERVICE (WELCOME CENTER)	28	6%	
47	2-2 NEW SERVICE - FOLLOW -UP	37	8%	
48	3-1 ADD/ADD	64	14%	
49	3-2 ADD/REMOVE	12	3%	

FIG. 6C-1

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	A	C	D	E
50	3-3 DISCONNECT	11	2%	
51	4-1 BILLING/PHONE DIRECTORY	1	0%	
52	4-2 BILLING/ UNAUTHOURIZED CALLS	11	2%	
53	4-3-1 BILLING/OTHER/PAY/MASTER K	3	1%	
54	4-3-2 BILLING/OTHER/MASTER KEY	11	2%	
55	4-3-3 BILLING/OTHER/OTHER	71	16%	
56	5 REPAIR (REPAIR CENTER)	14	3%	
57	1-2 (SPANISH)	1	0%	
58	[INDICATE FUNCTIONS COMPLETED IN IVR]	0	0%	
59	PAYMENT CENTER LOCATION	3	1%	
60	PAYMENT CENTER HOURS	0	0%	
61	PAYMENT MAILING ADDRESS	2	0%	
62	ACCOUNT INFORMATION	14	3%	
63	ESTABLISH ACCT USING PIN	0	0%	
64	PAYMENT ARRANGEMENTS	1	0%	
65	ENTER DETAILS OF LAST PAYMENT	0	0%	
66	COPY OF BILL	0	0%	
67	ORDER PHONE DIRECTORY	0	0%	
68	IDENTIFY UNAUTH CALL	4	1%	
69	GET 800 # TO IDENTIFY UNAUTH CALLS-ETC.	3	1%	
70				
71	AGENT CALL SUMMARY: (PROBLEM + SOLUTION)			
72				
73				
74	COULD THIS HAVE BEEN DONE IN MK/TB	24	5%	
75				
76	I. DID AGENT PERFORM AUTOMATED FUNCTIONS?	25	6%	
77	[INDICATE WHICH ONES]			
78	PAYMENT CENTER LOCATION	0	0%	
79	PAYMENT CENTER HOURS	0	0%	
80	PAYMENT MAILING ADDRESS	0	0%	
81	ACCOUNT INFORMATION	9	2%	
82	ESTABLISH ACCT USING PIN	0	0%	
83	PAYMENT ARRANGEMENTS	5	1%	
84	ENTER DETAILS OF LAST PAYMENT	0	0%	
85	COPY OF BILL	5	1%	
86	ORDER PHONE DIRECTORY	1	0%	
87	IDENTIFY ABC UNAUTH CALL	5	1%	
88	IDENTIFY XYZ ETC. UNAUTH CALL	0	0%	
89				
90	II. DID AGENT DO POTENTIALLY AUTO FUNCTIONS?	16	4%	
91	[INDICATE WHICH ONES]			
92	FIND TOLL CALL RANGE	8	0%	
93	REQUEST CALLING CARD			
94	GET VOICE MAIL ACCESS #	3	0%	
95	GET 3+2 DIGIT NUMBER ON BILL	2	0%	
96	GET INFO ON RATES-BY MAIL OR SEE DIRECT	0	0%	
97	GET ADDRESS FOR WRITING TO REFUTE BILL	0	0%	

FIG. 6C-2

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	A	C	D	E
98	OTHER: (POTENTIALLY AUTOMATABLE)	3	0%	
99				
100	III. DID AGENT DO NON-AUTOMATED FUNCTIONS?	220	49%	
101	[INDICATE WHICH ONES]			
102	PAYMENT ARRANGEMENTS	5	1%	
103	NEW SERVICE- EXPLAINS 2 PARTS NEEDED	21	5%	
104	NEW SERVICE FOLLOW UP (NOT DISCONNECT)	10	2%	
105	CHECK ON STATUS OF PENDING ORDER	6	0%	
106	SALES (PKGS, SERVICES, LINES, JACKS, ETC)	65	15%	
107	SALES (REMOVE FEATURE- AGENT ASKS WHY)	16	4%	
108	DISCONNECT (AND FORWARD CALLS)	9	2%	
109	EXPLAIN BILL	25	6%	
110	REMOVE UNAUTHORIZED CALL FROM BILL	4	1%	
111	REMOVE OTHER CHARGES FROM BILL	2	0%	
112	CONFIRM TODAY'S REPAIR SCHEDULE	3	1%	
113	SCHEDULE A VISIT WIHT REPAIRMAN	8	2%	
114	TELL HOW/WHEN TO USE FEATURES THEY OWN	12	3%	
115	OTHER	34	8%	
116	WAS THIS CALL CODED ABOVE?	675	579	
117	DID AGENT SEE CALL AS MISDIRECTED?	81	18%	
118	DID AGENT TRANSFER THE CALL?	82	18%	
119	IV. IF TRANSFERRED, TO WHAT DESTINATION?	0	0%	
120	800-281-8584 MASTER KEY	0	0%	
121	800-275-2355 REPAIR	12	3%	
122	800-287-9933 COLLECTION CENTER	10	2%	
123	800-870-0000 SERVICE SOLUTIONS	0	0%	
124	TPV	1	0%	
125	888-243-9733 TOLL BILLING	9	2%	
126	800-246-2800 UNLAWFUL CALL SOL CTR	0	0%	
127	800-585-6127 INSTALLATION HOTLINE	11	2%	
128	877-525-2375 DSL	2	0%	
129	800-427-9977 "BUSINESS OFFICE"	1	0%	
130	DMC	1	0%	
131	NEW SERVICE FOLLOWUP	1	0%	
132	DISCONNECT	1	0%	
133	TELL HOW TO USE FEATURES	1	0%	
134	WELCOME CENTER	10	2%	
135	BUSINESS ACCOUNTS	2	0%	
136	ISP CALL/VERIZON ONLINE	2	0%	
137	WIRELESS	3	1%	
138	DIFFERENT CARRIER	2	0%	
139	SUPERVISOR	0	0%	
140	OTHER	3	1%	
141	TRANSER TO SPANISH AGENT	6	1%	
142	WAS TRANSER WARM (AGENT STAYED)?	34	8%	
143	DURATION WITH SECOND AGENT?	663	0.292715232	
144	FURTHER TRANSFERS?	14	3%	
145	[IF YES]			
146	TOTAL NUMBER OF AGENTS INVOLVED	205	9%	

FIG. 6C-3

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	A	C	D	E
147				
148	EXPLAIN:			
149				
150	**TOPIC SUMMARY**			
151	PAYMENT ARRANGEMENT	10		
152	NEW SERVICE	21		
153	ORDER FOLLOW-UP	16		
154	SALES-ADD	65		
155	SALES-REMOVE	16		
156	DISCONNECT	9		
157	PHONE DIRECTORY	1		
158	IUNAUTHORIZED CALLS	9		
159	BALANCE/COPY...	14		
160	OTHER	89		
161	REPAIR	11		
162	SPANISH	6		
163	REROUTE			
164		267		
165				
166				
167				
168				
169				
170				
171				
172				
173				
174	**ROUTING SUMMARY**			
175	1 OR 4-3-1 PAY ARRANGMENTS (MASTER KEY)			
176	2-1 ORDER NEW SERVICE (WELCOME CENTER)			
177	2-2 NEW SERVICE-FOLLOW-UP			
178	3-1 ADD/ADD			
179	3-2 ADD/REMOVE			
180	3-3 DISCONNECT			
181	4-1 BILLING/PHONE DIRECTORY			
182	4-2 BILLING/UNAUTHORIZED CALLS			
183	4-3-2 BALANCE/COPY/LOCATIONS/LAST PAYMENT			
184	4-3-3 OTHER			
185	5 REPAIR (REPAIR CENTER)			
186	1-2 (SPANISH)			
187	ROTARY (INITIAL TIMEOUT)			
188	INVALID, TIMEOUT, OR "0" ONCE IN IVR			
189	OTHER (UNKNOWN)			

FIG. 6C-4

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DATA	CONCLUSION
1. CUSTOMER ROUTES SELF IN IVR TO WRONG AGENT 2. AGENT TRANSFERS CUSTOMER IN RESPONSE TO CUSTOMER NEED.	MISROUTING (2 OR MORE AGENTS INVOLVED INSTEAD OF 1)
1. CUSTOMER ROUTES SELF IN IVR TO WRONG AGENT 2. AGENT PERFORMS FUNCTION ANYWAY.	MISROUTING (WRONG AGENT INVOLVED)
1. AGENT PERFORMS FUNCTION. 2. FUNCTION IS AVAILABLE IN IVR.	UNDERUTILIZATION OF IVR FUNCTIONALITY.
1. AGENT PERFORMS FUNCTION 2. FUNCTION NOT CURRENTLY AVAILABLE IN IVR. 3. FUNCTION COULD POTENTIALLY BE ADDED	IVR MISSING CRUCIAL FUNCTIONALITY
1. CUSTOMERS OPTING OUT OF IVR AT FEW POPULAR POINTS. 2. IVR DOES NOT PROMPT FOR ID AT THE POINT.	MISSED OPPORTUNITY FOR AUTOMATED CUSTOMER DATA INPUT
1. AGENT STAYS ON THE LINE DURING TRANSER 2. POLICY DOES NOT ADVOCATE A "WARM TRANSFER"	POSSIBLE POLICY VIOLATION (REGARDING WARM TRANSFERS)
1. AGENT STAYS ON THE LINE DURING TRANSFER 2. TIME ON HOLD WITH CUSTOMER SUGGESTS AGENT NOT USING SPECIAL QUEUE FOR TRANSFER	POSSIBLE POLICY VIOLATION (REGARDING USE OF FAST QUEUE FOR AGENT TRANSFERS)
1. # CUSTOMERS REMAINING SILENT IN IVR 2. PERCENTAGE OF ROTARY USERS KNOWN 3. IF 1 SUBSTANTIALLY EXCEEDS 2	CUSTOMERS REFUSING TO PLAY THE GAME
1. # COSTUMERS COOPERATING IN IVR 2. # CUSTOMERS GETTING READOUT BEFORE ABANDONING IF 1 SUBSTANTIALLY EXCEEDS 2	CUSTOMERS RECEIVING NO BENEFIT FROM IVR THOUGH WILLING TO TRY
1. # CALLS 2. # CALLERS COMPLETING AT LEAST 1 FUNCTIONS IN IVR (INCLUDING GETTING READOUT) AND NOT GOING TO AGENT IF 1 SUBSTANTIALLY EXCEEDS 2	LOW "COMPLETE-SELF-SERVE" RATE

FIG. 6D

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IVR EVENT
SEQUENCES

302

LOOK-UP TABLE
(FOR EACH
APPLICABLE IVR
EVENT: AUTOMATION
ACHIEVED)

1. ANNOTATE EVENT SEQUENCES WITH THE
AUTOMATION ACHIEVED
2. COLLAPSE DATA FOR EVERY CALL(IVR EVENT
SEQUENCE) INTO COUNTS FOR DISTINCT CALL
PROFILES
3. CONVERT COUNTS FOR EACH CALL PROFILE INTO
RELATIVE PERCENTAGES

S10

CALL PROFILES WITH
COUNTS, E.G., SELF-SERVE
5.6% TO SPECIALIST
WITH READOUT 1.8%

SPREADSHEET WITH ROW SHOWING THE CALL
PROFILES p_i, AND COLUMNS SHOWING THE RELATIVE
FREQUENCY f_i OF p_i, THE TOTAL BENEFIT b_i OF p_i
(WHICH IS THE SUM OF THE BENEFIT B_j OF ALL
"RELEVANT" AUTOMATION CATEGORIES, RELEVANT
MEANING THAT THE CALLER COMPLETED
AUTOMATION B_j IN PROFILE p_j) AND SAVINGS
POTENTIAL s_i FOR p_i.

S20

303

BENEFIT
ASSUMPTIONS B_j
(FOR AUTOMATION
CATEGORY A_j)

AUTOMATION RATES AND
TOTAL IVR BENEFIT

FIG. 7

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CALL PROFILE (Pj)	TRAFFIC (fi)		AUTOMATION (Bji)			BENEFIT (AGENT SECS)	
	CALLS	% CALLS	ACCOUNT #	ROUTING	INFO DELIVERY	ONE CALL	AVERAGE
FULLY-AUTOMATED CALLS	72	2.0%	A	R	I	105	2.1
TRANSFERS TO SPECIALIST AFTER INFORMATION READOUT	1	0.0%	A	R	I	105	0.0
TRANSFERS TO FLOOR AFTER INFO READOUT	38	1.0%	A		I	55	0.6
TRANSFERS TO SPECIALIST W/ ID	849	23.4%		R		40	9.3
TRANSFERS TO FLOOR W/ ID	1008	27.7%	A			15	4.2
TRANSFERS TO FLOOR W/O ID	591	16.3%					
MISROUTED TO SPECIALIST W/ ID	389	10.7%	A	-R		-25	-2.7
MISROUTED TO SPECIALIST W/O ID	6	0.2%		-R		-40	-0.1
ABANDONS	681	18.7%					
TOTAL	3636	100.0%	41.5%	14.5%	3.1%		13.4

FIG. 8

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AUTOMATION CATEGORY	CALLER IDENTIFICATION ("A")	INFORMATION DELIVERY ("I")	ROUTING ("R")
ASSUMED BENEFIT [AGENT SECS]	15	40	40

FIG. 9

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AUTOMATABLE TRANSACTIONS	#OCCURRENCES	TIME SPENT	FREQUENCY	SAVINGS POTENTIAL	AUTOMATION CATEGORY
ACCOUNT_BALANCE	88	27.31	21.5%	5.9	I
NEW_PAYMENT_ARRANGEMENT	56	20.94	13.7%	2.9	T
CURRENT_PAYMENT_ARRANGEMENT	9	22.08	2.2%	0.5	I
ZIP_CODE	2	9.48	0.5%	0.0	A
PAYMENT_LOCATION	18	21.3	4.4%	0.9	I
BALANCED_PAYMENT_PLAN_AMOUNT	6	21.8	1.5%	0.3	I
RULES_12_AND_22	11	13.5	2.7%	0.4	I
NEW_APPOINTMENT_DATE_TIME	84	14.51	20.5%	3.0	A
IS_GAS_APPLIANCE	3	24.75	0.7%	0.2	A
IS_NOT_GAS_APPLIANCE	3	9.22	0.7%	0.1	A
NEW_APPOINTMENT_CONFIRMATION_TELEP	82	18.26	20.0%	3.7	A
NEW_APPOINTMENT_LOCATION	66	15.19	16.1%	2.5	A
NEW_APPOINTMENT_DOG	57	11.72	13.9%	1.6	A
NEW_APPOINTMENT_MULTI_OR_SINGLE		0	0.0%	0.0	A
NEW_APPOINTMENT_ADULT_PRESENT	5	5.29	1.2%	0.1	A
APPOINTMENT_DETAILS_CONFIRMATION	13	36.14	3.2%	1.1	T
TOTAL NUMBER OF ANNOTATED CALLS	409			23.1	

%HANDLED BY AGENT 72%

WEIGHTED OPPORTUNITY: 16.6

FIG. 10

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AUTOMATION CATEGORIES

CUSTOMER CONTACT TYPE	% CALLS	CUSTOMER ID	ROUTING	INFO DELIVERY	TRANSACTION
CUSTOMER SERVICE	8.7%	X			
BALANCE BILLING	36.7%	X	X	X	
PAYMENT ARRANGEMENTS	13.0%	X	X	X	X
PAYMENT OPTIONS	4.0%	X	X	X	
TURN ON	3.0%				
RATES	1.3%		X	X	
STOP SERVICE	3.5%	X			
SERVICE	11.5%	X			
APPOINTMENT	16.5%	X	X	X	X
EMERGENCY	1.8%	X			
TOTAL/UPPER BOUNDS	100.0%	95.7%	71.5%	71.5%	29.5%

HOW TO TRANSFORM UPPER BOUNDS ON AUTOMATION TO AGENT TIME SAVING OPPORTUNITIES:

BENEFIT ASSUMPTION [AGENT SECS PER CALL]	15	5	40	40
BENEFIT [AGENT SECS]	14.355	3.575	28.6	11.8
TOTAL OPPORTUNITY	58.33			

95.7% x 15 = 14.355

FIG. 11

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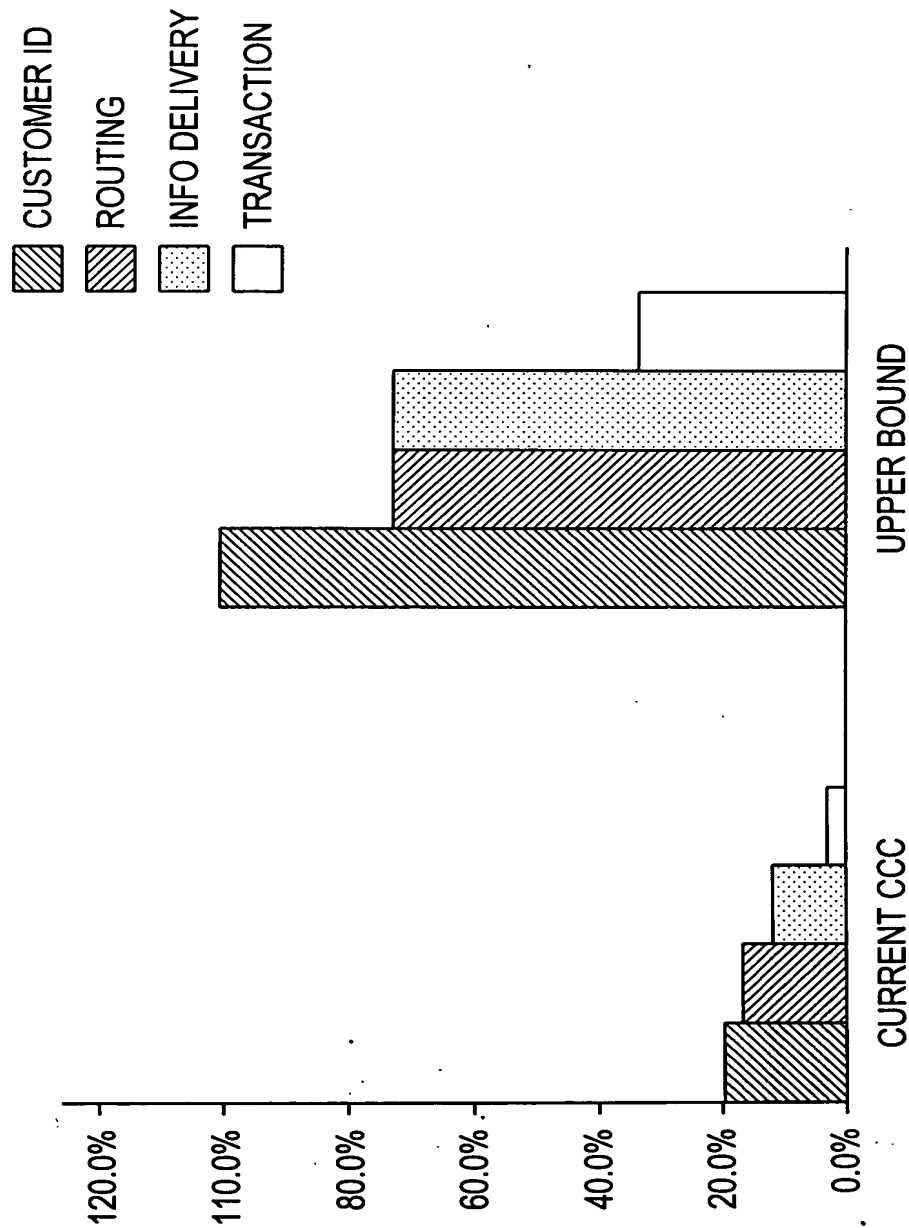
FIG. 12

EXISTING AUTOMATION LEVELS AND UPPER BOUNDS ON AUTOMATION RATES

FIG. 13

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START

4319 (*100.0*, 100.0)

GREETING — 234 (*5.4*, 5.4) ABANDON ○

4085
(*94.6*,94.6)

311(*7.6*, 7.2) TO_FLOOR_NEW
ACCOUNT
186(*4.6*, 4.3) TO_FLOOR
46(*1.1*, 1.1) ABANDON ○

OPENING_MENU

3542
(*86.7*,82.0)
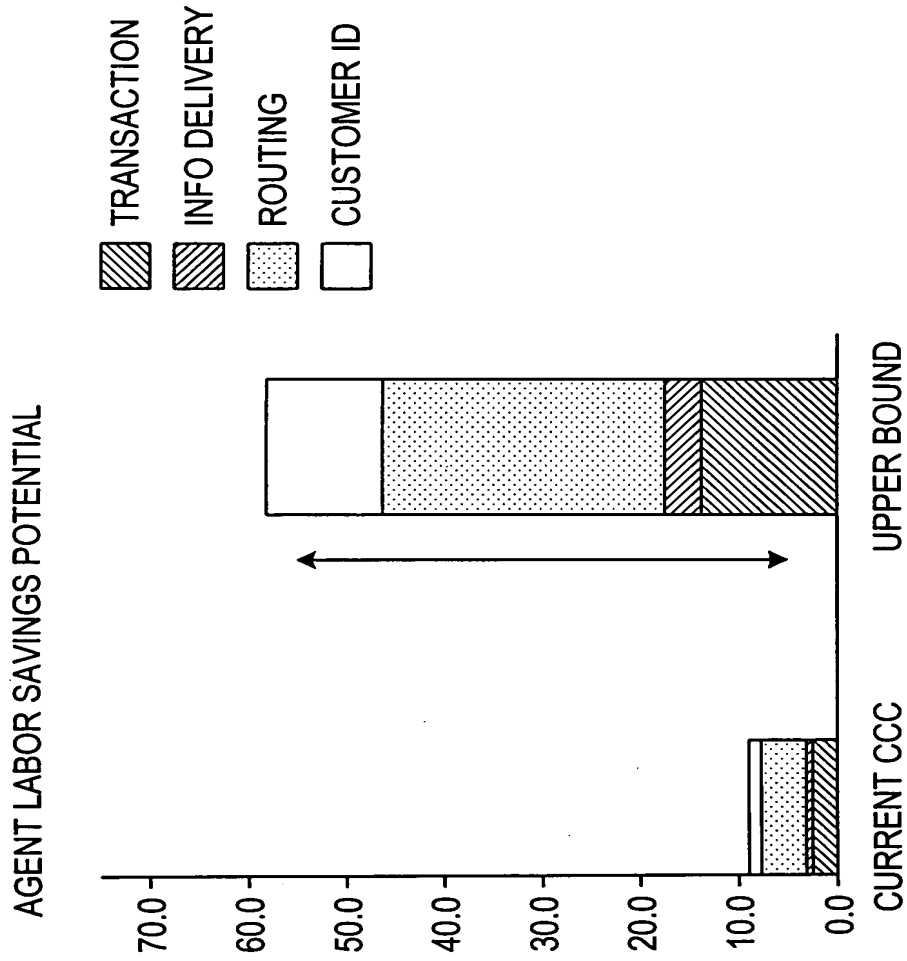
DIAGRAM
"STATE"CORRESPONDS
TO ONE OR MORE IVR
INTERACTIONS WITH
CALLER (PROMPT,
RESPONSE, AND
RESULTING ACTION)
THIS ID_ENTRY STATE
INCLUDES TIMEOUT AND
ERROR RETIRES.

ID_ENTRY — 366(*10.3*, 8.5) ABANDON ○

415
(*11.7*, 9.6)

BREAKDOWN OF IVR
EXIT CONDITIONS
(TRANSFERS AND
HANGUPS)

ALT_ID_ENTRY ○

274 (*66.0*, 6.3) TO_FLOOR
82 (*19.8.* 1.9) ABANDON

2761(*78.0*,63.9)

CALLS FOLLOWING
THIS PATH

AS A PERCENTAGE OF
CALLS LEAVING THE
STATE

AS A PERCENTAGE OF
TOTAL CALLS

59(*14.2*,1.4)

1045(*36.4*, 24.2)
SPECIALIST_TYPE_1
105(*3.7*, 2.4) SPECIALIST_TYPE_2
77(*2.7*,1.8) SPECIALIST_TYPE_3
3(*0.1*,0.1)SELF_SERVE
4(*0.1*,0.1)TO_FLOOR_AFTER_
READOUT
31(*1.1*,0.7) TO_FLOOR
74(*2.6*, 1.7) ABANDON ○

FIG. 14

MAIN_MENU

566(*19.7*,13.1)

966(*33.6*,22.3)

31(*3.2*,0.8)
LOOPBACKS

11(*1.9*,0.3)
LOOPBACKS

○ SUB_MENU
IVR
EXITS

OTHER_OPTIONS ○
IVR
EXITS

CONTINUATIONS

CONTINUATIONS

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500

600

700

IVR EVENT
SEQUENCES

CALL FLOW
MODEL

LOOK-UP TABLE
(FOR EACH APPLICABLE
IVR EVENT: AUTOMATION
ACHIEVED)

S1001

FOR EVERY IVR EVENT SEQUENCE:
1. INCREMENT TRANSITION AND MODALITY COUNTER FOR EVERY
STATE TRANSITION IN THE EVENT SEQUENCE
2. INCREMENT THE APPROPRIATE EXIT CONDITION COUNTER AT THE
IVR EXIT POINT, INCLUDING THE LEVEL OF AUTOMATION ACHIEVED

S1002

VISUALIZE STATE TRANSITION DATA

800

USER-PATH DIAGRAM

FIG. 15

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FIG. 15A

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TRUE CALL TYPE (FROM AGENT INTERACTION)

CALLER'S TT MENU CHOICE	SPECIALTY 1	SPECIALTY 2	SPECIALTY 3	FLOOR	CALLS BY ROUTING	CORRECTLY ROUTED
SPECIALTY 1	33	0	16	16	65	51%
SPECIALTY 2	0	24	0	0	24	100%
SPECIALTY 3	0	2	8	0	10	80%
FLOOR	22	10	26	150	208	72%
CALLS BY TRUE TOPIC	55	36	50	166	307	
TOPIC VOLUME	18%	12%	16%	54%	100%	
CORRECTLY IDENTIFIED	60%	67%	16%	90%		

70% OVERALL ACCURACY

DIAGONAL = CORRECTLY ROUTED
OTHERS = MISROUTED

FIG. 16
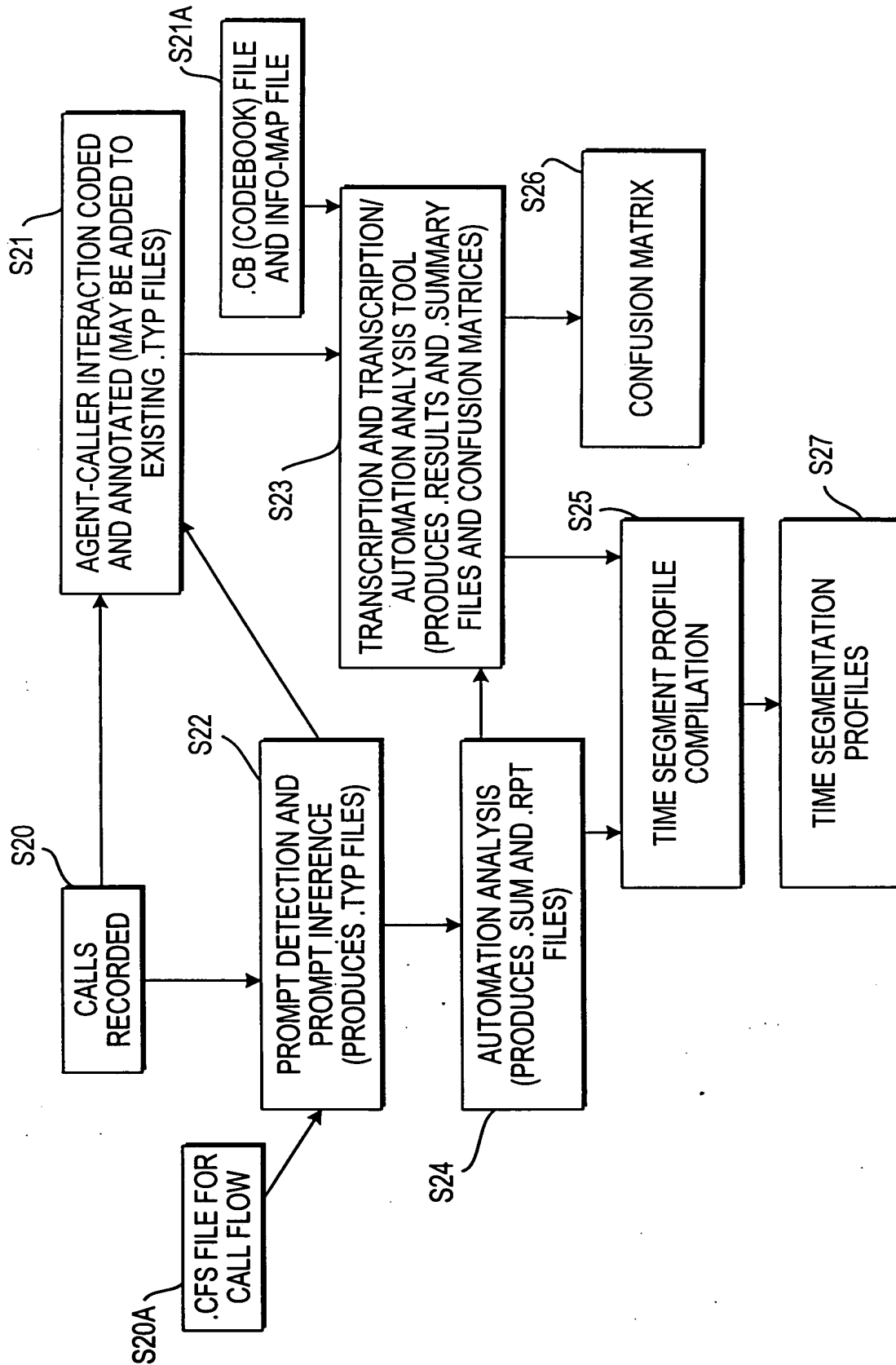
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FIG. 16A

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	A FILENAME	B IVR EXIT	C IVR ROUTING	D IVR INFORMATION	E IVR ROUTING DEST	F FIRST AGENT	G FIRST AGENT	H FIRST TOPIC
2	/D4M/TRANS/	INCOMPLETE	P-AGT_STARTHOMESERVICE	RULES_12_AND_22_READOUT	TURNON			STRT
3	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMNEWPAY	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-CHG
4	/D4M/TRANS/	INCOMPLETE	P-AGT_NEWPAYMENTARRAN	CALLING_FROM_SERVICE_LOCATION,TELEPHONE,CO	PAYMENTX			PAY-MAK
5	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMTELEPHON	CALLING_FROM_SERVICE_LOCATION,CONFIRM	BALANCEBILLING			PAY-MAK
6	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMBILLING		BALANCEBILLING			ECI
7	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMBILLING		BALANCEBILLING			RSTR
8	/D4M/TRANS/	INCOMPLETE	P-AGT_DUPSTATFAILURE	CALLING_FROM_SERVICE_LOCATION,TELEPHONE	BALANCEBILLING			OTH
9	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK
10	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-REV
11	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMCONFIRMA	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-MAK
12	/D4M/TRANS/	INCOMPLETE	P-AGENT_START_COMM	RULES_12_AND_22_READOUT	TURNON			CHNG
13	/D4M/TRANS/	INCOMPLETE	P-AGT_NEWPAYMENTARRAN	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-MAK
14	/D4M/TRANS/	INCOMPLETE	P-AGT_STARTCLEANANDSHO	RULES_12_AND22_READOUT	TURNON			CHNG
15	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMBILLING		BALANCEBILLING			PAY-MAK
16	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMNEWPAY	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-MAK
17	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK
18	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMDUPLICATE	CALLING_FROM_SERVICE_LOCATION,TELEPHONE,CO	BALANCEBILLING			ECI
19	/D4M/TRANS/	INCOMPLETE	P-AGT_STARTGASHOME	RULES_12_AND_22_READOUT	TURNON			STRT
20	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMTELEPHON	CALLING_FROM_SERVICE_LOCATION,TELEPHONE	PAYMENTX			BAL
21	/D4M/TRANS/	INCOMPLETE	P-AGT_NEWPAYMENTARRAN	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-MAK
22	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMTELEPHON	CALLING_FROM_SERVICE_LOCATION,TELEPHONE	BALANCEBILLING			PAY-MAK
23	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMCONFIRMA	CALLING_FROM_SERVICE_LOCATION,TELEPHONE,CO	PAYMENTX			PAY
24	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			OTH
25	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK
26	/D4M/TRANS/	INCOMPLETE	P-AGENT-ID-MAKE-APPOINTM		APPOINTMENT			RSTR
27	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			RSTR
28	/D4M/TRANS/	INCOMPLETE	P-AGT_STARTHOMESERVICE	RULES_12_AND_22_READOUT	TURNON			STRT
29	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK
30	/D4M/TRANS/	INCOMPLETE	P-AGEND-MAIL_ELEC_R	RULES_12_AND_22_READOUT	RATES			STRT
31	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK
32	/D4M/TRANS/	INCOMPLETE	P-AGT_REFUSEDNEWPAY_M	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-MAK
33	/D4M/TRANS/	INCOMPLETE	P-AGT_INCORRECTNOCURRE	CALLING_FROM_SERVICE_LOCATION,CONFIRM_ADDR	PAYMENTX			PAY-REV
34	/D4M/TRANS/	INCOMPLETE	P-AGT_XFERFROMTELEPHON	CALLING_FROM_SERVICE_LOCATION,TELEPHONE	PAYMENTX			PAY-MAK
35	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMBILLING		BALANCEBILLING			BIL
36	/D4M/TRANS/	INCOMPLETE	P-AGT_CSRFROMMAIN		CUSTOMERSERVICE			PAY-MAK

FIG. 17

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FIG. 18

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FIG. 19

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FIG. 19A

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FIG. 20

INTERACTIVE VOICE RESPONSE (IVR)UNIT — 900

DETERMINE ROUTING

AUTOMATED FULFILLMENT

QUERY SAMPLE OF USERS FOR TRUTH*

*AFTER PROVIDING AUTOMATED FULFILLMENT, QUERY USER: "TO HELP IMPROVE OUR AUTOMATED SYSTEM, DID YOU RECEIVE THE INFORMATION THAT YOU SOUGHT?"

"TRUTH"

IVR LOGS

ACD REPORTS

ACD CALL ROUTING — 902

CALLS — 904

HUMAN AGENT — 903

"TRUTH"

OTHER DATA SOURCES

DATA ANALYSIS — S2000

PERFORMANCE MODEL — 905

ASSESSMENT DATA

PERFORMANCE DEGRADATION ALARM — 907

IVR PERFORMANCE REPORT — 906